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67,010-072  
PA-004.2715-US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Andrei Leonida  
Serial No.: 10/814,019  
Filed: 03/31/2004  
Group Art Unit: 1795  
Examiner: Crepeau, Jonathan  
Title: HARDWARE SYSTEM FOR HIGH PRESSURE ELECTROCHEMICAL  
CELL

**CORRECTED APPEAL BRIEF**

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

In response to the Notification of Non-Compliant Appeal Brief mailed May 15, 2009,  
Appellant hereby submits its Corrected Appeal Brief.

**Real Party in Interest**

Hamilton Sundstrand is the real party in interest of the present application. An assignment of all rights in the present application to Hamilton Sundstrand was recorded by the U.S. Patent and Trademark Office at Reel 015165, Frame 0453.

**Related Appeals and Interferences**

There are no appeals or interferences related to the present application of which the Appellant is aware.

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67,010-072  
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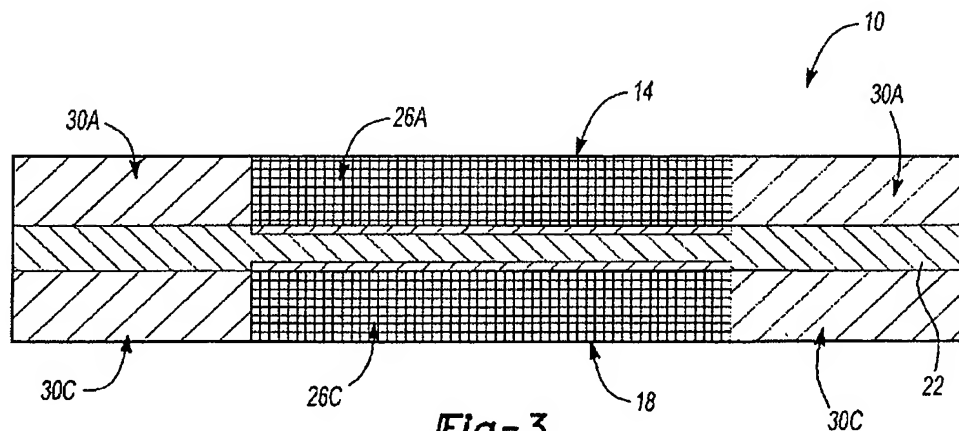
Claims 1-9 and 22-29, which are presented in the Appendix, stand finally rejected. Claims 10 and 21 have been cancelled. Claims 11-20 are withdrawn from consideration. Accordingly, the Appellant hereby appeals the final rejection of claims 1-9 and 22-29.

**Status of Amendments**

All amendments have been entered.

**Summary of Claimed Subject Matter****Summary of Independent Claim 1**

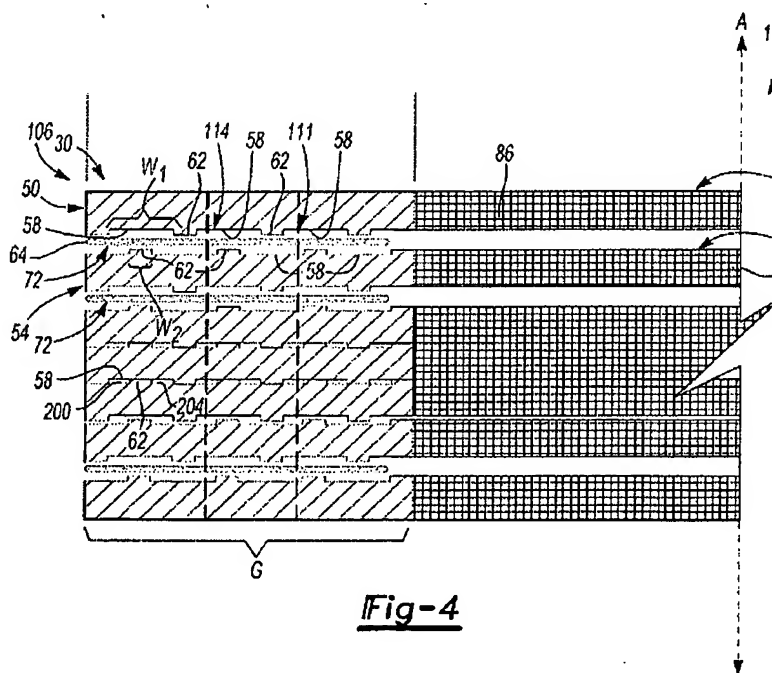
Independent claim 1 generally relates an electrochemical cell structure 100 used to form an electrochemical cell 10 (page 6, paragraph 26). The electrochemical cell 10 has an anode cavity 14 spaced from a cathode cavity 18 (page 6, paragraph 26). The anode cavity 14 and the cathode cavity 18 sandwich an electrochemically conductive medium 22 through which fluid from the anode cavity 14 and the cathode cavity 18 interact (page 6, paragraph 26). The basic structure of the electrochemical cell 10 is shown in Figure 3 of the application and is set forth below:



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The anode cavity 14 and the cathode cavity 18 of the electrochemical cell 10 are formed by stacks of the electrochemical cell structure 100 (page 7, paragraph 27), as shown below. The electrochemical cell structure 100 has a first conductive member 50, having a first central area 26 and a first peripheral area 30 extending around the first central area 26 (page 7, paragraph 27). The first central area 26 has a first set of openings 86 for conducting a fluid through the first conductive member 50 (page 7, paragraph 27).

The electrochemical cell structure 100 also has a second conductive member 54, which is stacked on the first conductive member 50 along an axis A (page 7, paragraph 27). The second conductive member 54 has a second central area 26 and a second peripheral area 30 (page 7, paragraph 27). The second central area 26 has a second set of openings 98 in fluid communication with the first set of openings 86 of the first conductive member 50 (page 7, paragraph 27).



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Particularly with reference to Figure 4 of the application, shown above, the first conductive member 50 has a volume 58 on the first peripheral area 30 while the second conductive member 54 has a protrusion 62 on the second peripheral area 30 extending into the volume 58 (page 7, paragraph 28). A securing member 64, such as an adhesive tape, is disposed between the volume 54 and the protrusion 62 (page 8, paragraph 30). The volume 54 is sized larger than the protrusion 62 prior to insertion of the protrusion into the volume 54 (page 7, paragraph 28). The securing member 64 attaches the first conductive member 50 to the second conductive member 54 (page 8, paragraph 30).

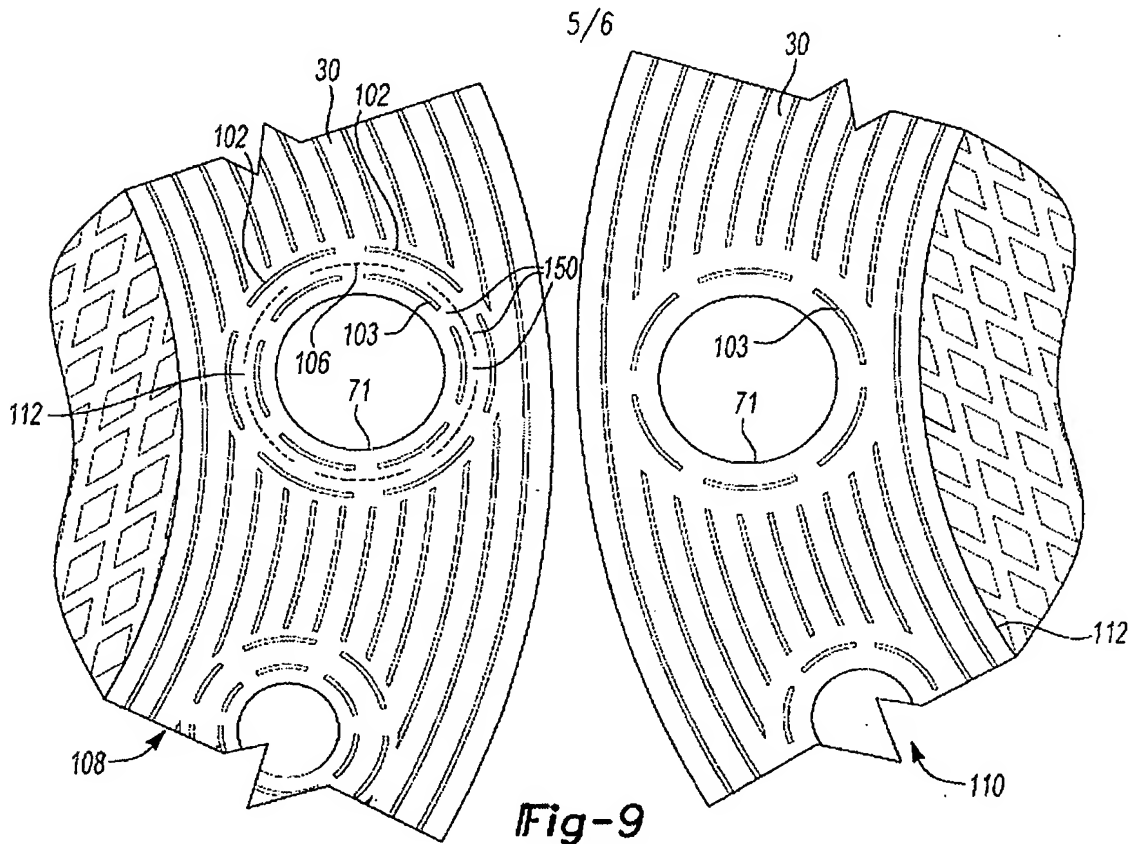
**Summary of Independent Claim 27**

Like independent Claim 1, independent Claim 27 generally relates to an electrochemical cell structure 100 with a first conductive member 108 (page 10, paragraph 37), having a first central area 26 and a first peripheral area 30 extending around the first central area 26 (page 7, paragraph 27). The first central area 26 has a first set of openings 86 for conducting a fluid through the first conductive member 108 (page 7, paragraph 27). The electrochemical cell structure 100 also has a second conductive member 110 (page 10, paragraph 37), which is stacked on the first conductive member 108 along an axis A (page 7, paragraph 27). The second conductive member 110 has a second central area 26 and a second peripheral area 30 (page 7, paragraph 27). The second central area 26 has a second set of openings 98 in fluid communication with the first set of openings 86 of the first conductive member 108 (page 7, paragraph 27).

With reference to Figure 9 of the patent application, set forth below, the first conductive member 108 has a first protrusion 102, a second protrusion 106 and a volume 112 on the first peripheral area 26 (pages 10-11, paragraph 37). The volume 112 is spaced between the first protrusion 102 and the second protrusion 106 (ages 10-11, paragraph 37). The second conductive

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member 110 has a third protrusion 103 (pages 10-11, paragraph 37) extending into the volume 112, wherein the first protrusion 102, the second protrusion 106, and the third protrusion 103 define a tortuous path 150 (pages 10-11, paragraph 37). A securing member 64 is disposed in the volume 112 (pages 10-11, paragraph 37).



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PA-004.2715-US**Grounds of Rejection to be Reviewed on Appeal**

A. Are claims 1-3, 5-9 and 22-29 properly rejected under 35 U.S.C. §103(a) as being obvious over *Titterington* (U.S. 5,316,644) in view of WO 2004/086541 in view of *Fujii et al.* (U.S. 4,798,946)?

B. Is claim 4 properly rejected under 35 U.S.C. §103(a) as being obvious over *Titterington* (U.S. 5,316,644) in view of WO 2004/086541 in view of *Fujii et al.* (U.S. 4,798,946), and further in view of *Mao* (U.S. 6,989,214)?

**ARGUMENT**

A. The rejection of claims 1-3, 5-9 and 22-29 under 35 U.S.C. §103 is improper.

1. The rejection of claims 1-3, 5-9 and 22-26 under 35 U.S.C. §103 is improper.

The Examiner rejected Claims 1-3, 5-9 and 22-26 under 35 U.S.C. 103(a) as being unpatentable over *Titterington, et al.* in view of WO 2004/086541 in view of *Fujii, et al.* Claim 1 requires in pertinent part “said volume is sized larger than said protrusion prior to insertion of said protrusion into said volume.” The Examiner acknowledges that this feature is not taught by the combination of *Titterington, et al.* and WO ‘541. [Final Office Action (11/17/2008), p. 3]. Instead, the Examiner seeks to supply this missing element with the teaching of *Fujii, et al.* The Examiner contends that Figures 8, 9, 10 and 12 of *Fujii, et al.* teach a “sealing configuration wherein a protrusion (24) is sized to be smaller than a volume (14) before insertion of the protrusion into the volume.” [Final Office Action (11/17/2008), p. 3]. The Examiner contends that the combination of *Titterington, et al.* and WO ‘541 would benefit from the teaching of *Fujii, et al.* because any bonding agent would not be forced out of the volume by the projection. [Final Office Action (11/17/2008), p. 4].

However, the welding technique of WO ‘541 is improperly combined with the teachings of *Fujii, et al.* First, WO ‘541 shows rib 25 matching groove 30. Accordingly, welding of rib 25

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to groove 30 results in fusing of materials not only at the bottom of groove 30 but along its sides. [Response (5/9/08), p. 9]. Expanding groove 30 of WO '541, as the Examiner suggests is taught by *Fujii, et al.*, would eliminate contact of ribs 25 with the sides of groove 30, thereby damaging the seal taught by WO '541 and destroying an object of the invention of WO '541. Indeed, WO '541 identifies the significance of "contact area between the mating ribs 25 and grooves 30" because such contact allows ribs 25 and grooves 30 to become "frictionally engaged." [WO '541, Para. 41, 48]. Reducing this contact area as taught by *Fujii, et al.* is against the teachings of WO '541. The cross-sections of *Fujii, et al.*, shown in Figs. 8, 9, 10 and 12, in fact, show gaps 41 that would hurt the seal of WO '541. Accordingly, *Fujii, et al.* destroys an object of the invention of WO '541.

The Examiner responds to this argument by stating that passages cited by Applicant are "directed to the welding technique of sealing the plates, to which the invention of WO '541 is not limited as previously asserted by the Examiner." [Advisory Action (1/15/2009), p. 2]. However, WO '541 makes clear that an important object of the invention is to "provide improved seals for bi-polar or coolant plates, and a process for making such seals, which reduces the disadvantages associated with conventional sealing techniques." [WO '541, p. 3]. Improving the seal is clearly an object of WO '541.

The Examiner next argues that there is no express "teaching away" from decreasing the contact between the sides of the groove and the ribs. [Advisory Action (1/15/2009), p. 2]. Again, it is an important object of WO '541 to have an improved seal, which seal would not be provided by the teachings of *Fujii et al.*

The Examiner finally argues that the sealing techniques of WO '541 and *Fujii et al.* are not incompatible, apparently, because "providing a larger groove would prevent the bonding

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agent from being forced out, which be advantageous in the structure of WO '541 for at least the reason that manufacturing would be simplified." [Advisory Action (1/15/2009), p. 2]. The Examiner, however, fails to explain how manufacturing would be simplified. Also, this argument fails to address why the seal of WO '541 is not weakened by the reduction of contact area taught by *Fujii et al.*

Because the combination of WO '541 and *Fujii et al.* is improper, Claim 1 and its dependents, Claims 2-3, 5-9, and 22-26, stand in condition for allowance.

**a. The rejection of claim 22 under 35 U.S.C. §103 is improper and separately allowable.**

Claim 22 depends upon Claim 1 and further requires "another volume spaced from said volume, said volume extending transversely relative to said another volume." The Examiner contends that "the combination of circumferential sealing and manifold hole sealing in *Titterington et al.* would read on this subject matter since portions of the manifold seals would be at approximately right angles to the circumferential seal(s)." [Final Office Action (11/17/2008), p. 5]. However, there is nothing in *Titterington et al.* that discloses the foregoing limitation. Indeed, the Examiner fails to cite where such feature is taught. The fact that the Examiner must rely upon WO '541 for the teaching of volumes also demonstrates that *Titterington et al.* does not disclose one volume extending transversely to another volume. Accordingly, Claim 22 is separately allowable from Claim 1.

**b. The rejection of claim 23 under 35 U.S.C. §103 is improper and separately allowable.**

Claim 23 depends upon Claim 1 and further requires "another protrusion spaced from said protrusion, said protrusion extending transversely relative to said another protrusion." Again, the Examiner contends that "the combination of circumferential sealing and manifold hole sealing in



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*Titterington et al.* would read on this subject matter since portions of the manifold seals would be at approximately right angles to the circumferential seal(s)." [Final Office Action (11/17/2008), p. 5]. However, there is nothing in *Titterington et al.* that discloses the foregoing limitation. The Examiner fails to cite where such feature is taught. The fact that the Examiner must rely upon WO '541 for the teaching of protrusions also demonstrates that *Titterington et al.* does not disclose one protrusion extending transversely to another protrusion. Accordingly, like Claim 22, Claim 23 is separately allowable from Claim 1.

**2. The rejection of claims 27-29 under 35 U.S.C. §103(a) is improper.**

Claim 27 requires in pertinent part "said first protrusion, said second protrusion and said third protrusion define a tortuous path." The Examiner rejected this claim in view of Fig. 3d of WO '541 as modified by *Fujii, et al.* Critically, the combination of the references fails to teach a "tortuous path" as required by Claim 27. The Examiner suggests that WO '541 shows such a path in the z-direction. However, Claim 27 requires that the "third protrusion" extend into the volume so that "said first protrusion, said second protrusion and said third protrusion define a tortuous path." With reference to Fig. 3d, once ribs 25 are disposed in grooves 30, there is no "tortuous path," even in the z-direction. Instead, a seal is formed. [WO '541, para. 39]. Therefore, the combination does not teach a "tortuous path" in any direction.

The Examiner also seeks to add new references, which describe a "tortuous path." However, creating a "tortuous path" for a gas or fluid in the sealing area of WO '541 would defeat an object of WO '541, i.e. creating a seal using matched ribs and grooves. Accordingly, the addition of a "tortuous path" runs contrary to the teachings of WO '541. Therefore, Claim 27 and its dependents, Claim 28-29, stand in condition for allowance.

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*B. The rejection of claim 4 under 35 U.S.C. §103 is improper.*

For the reasons that claim 1 is in condition for allowance, claim 4, which ultimately depends upon claim 1 is also allowable.

**CONCLUSION**

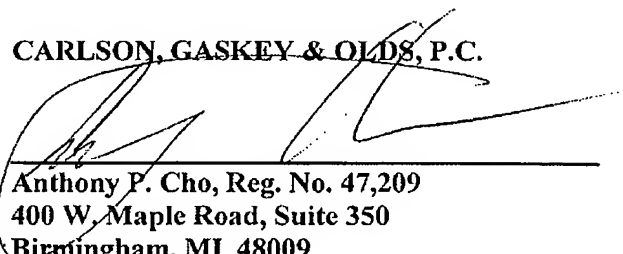
For the foregoing reasons, the final rejection of claims 1-9 and 22-29 is improper and should be withdrawn. All claims are in condition for allowance.

Respectfully submitted,

CARLSON, GASKEY & OLDS, P.C.

June 15, 2009

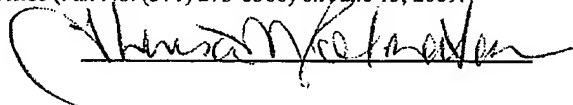
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**CERTIFICATE OF FACSIMILE**

I hereby certify that this Corrected Appeal Brief, relative to Application Serial No. 10/814,019, is being facsimile transmitted to the Patent and Trademark Office (Fax No. (571) 273-8300) on June 15, 2009.



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PA-004.2715-US**APPENDIX OF CLAIMS**

1. An electrochemical cell structure comprising:

a first conductive member having a first central area and a first peripheral area extending around said first central area, said first central area having a first set of openings for conducting a fluid through said first member;

a second conductive member having a second central area and a second peripheral area, said second central area having a second set of openings in fluid communication with said first set of openings;

said first conductive member having a volume on said first peripheral area and said second conductive member having a protrusion on said second peripheral area extending into said volume;

a securing member between said volume and said protrusion, said first conductive member stacked on said second conductive member along an axis; and

wherein said volume is sized larger than said protrusion prior to insertion of said protrusion into said volume and said securing member attaches said first conductive member to said second conductive member.

2. The electrochemical cell structure of Claim 1 wherein said securing member comprises an adhesive for adhering said first conductive member to said second conductive member.

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3. The electrochemical cell structure of Claim 2 wherein said adhesive comprises an adhesive tape having a liquid state and a solid state, said volume for receiving said adhesive tape in said liquid state.

4. The electrochemical cell structure of Claim 3 wherein said adhesive tape comprises an ethylene acrylic acid copolymer.

5. The electrochemical cell structure of Claim 1 wherein said volume extends at least partially around a hole in said first peripheral area.

6. The electrochemical cell structure of Claim 1 wherein said protrusion extends at least partially around a hole in said second peripheral area.

7. The electrochemical cell structure of Claim 6 wherein said protrusion comprises a first protrusion and a second protrusion, said first protrusion spaced radially from said second protrusion relative to said axis.

8. The electrochemical cell structure of Claim 1 wherein said first conductive member and said second conductive member generally comprise a cylinder extending along said axis, wherein one of said protrusion and said volume extends circumferentially about said axis.